Ebola Update for WI Assisted Living Providers

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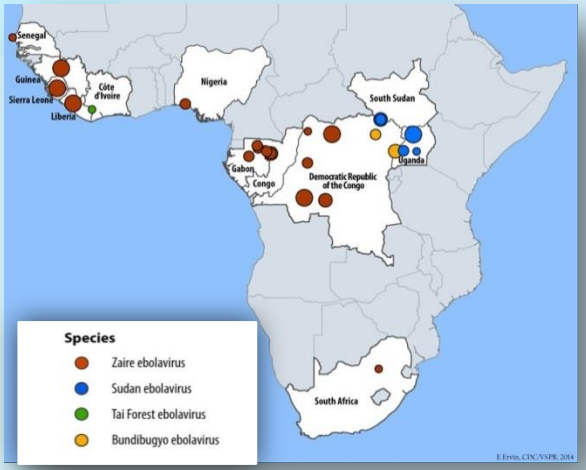
November 4, 2014

Ebola Virus

- Viral Hemorrhagic Fever
  - Filovirus: enveloped, RNA virus
  - Severe disease with high mortality
  - Absence of specific treatment or vaccine

- >20 previous Ebola and Marburg virus outbreaks
- 2014 West Africa Ebola outbreak caused by *Zaire ebolavirus* species (five known Ebola virus species)



Ebola Virus

- Zoonotic virus – bats the most likely reservoir, although species unknown
- Spillover event from infected wild animals (e.g., fruit bats, monkey, duiker) to humans, followed by human-human transmission

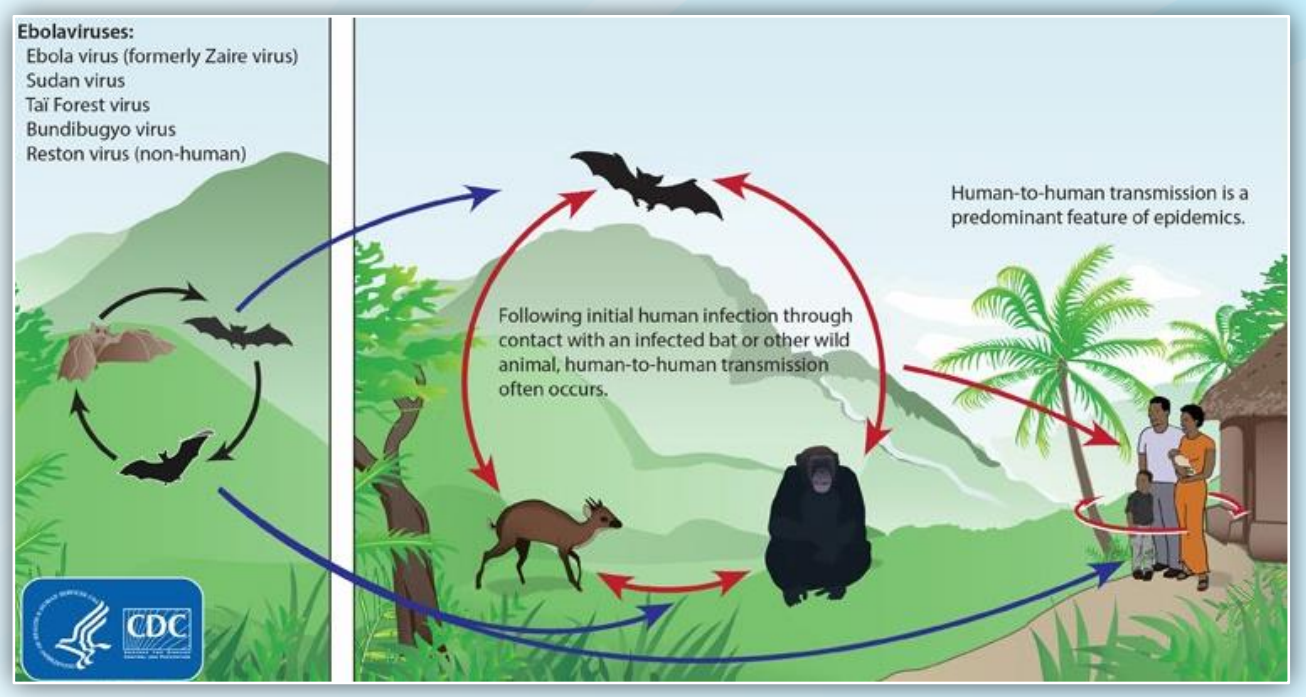
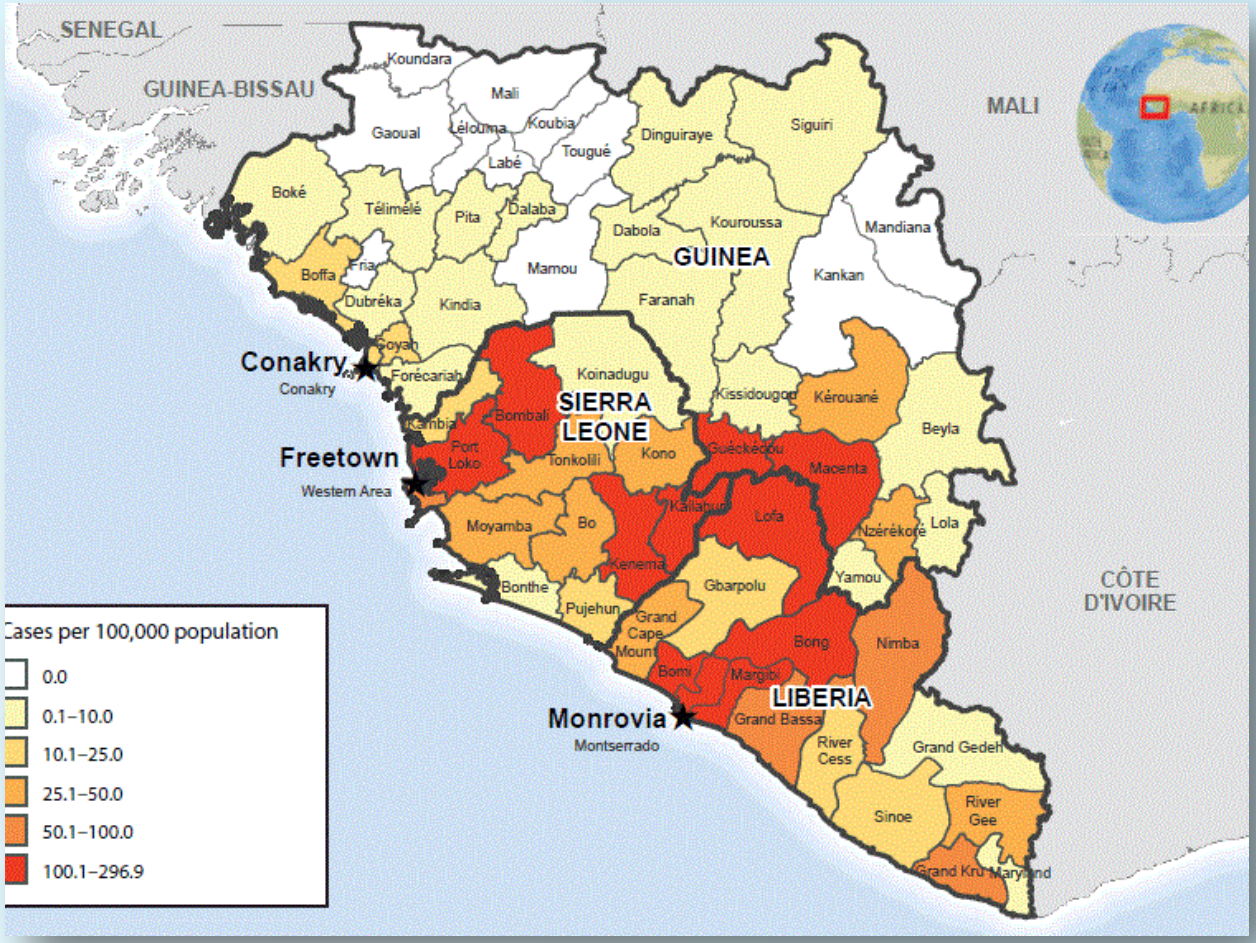
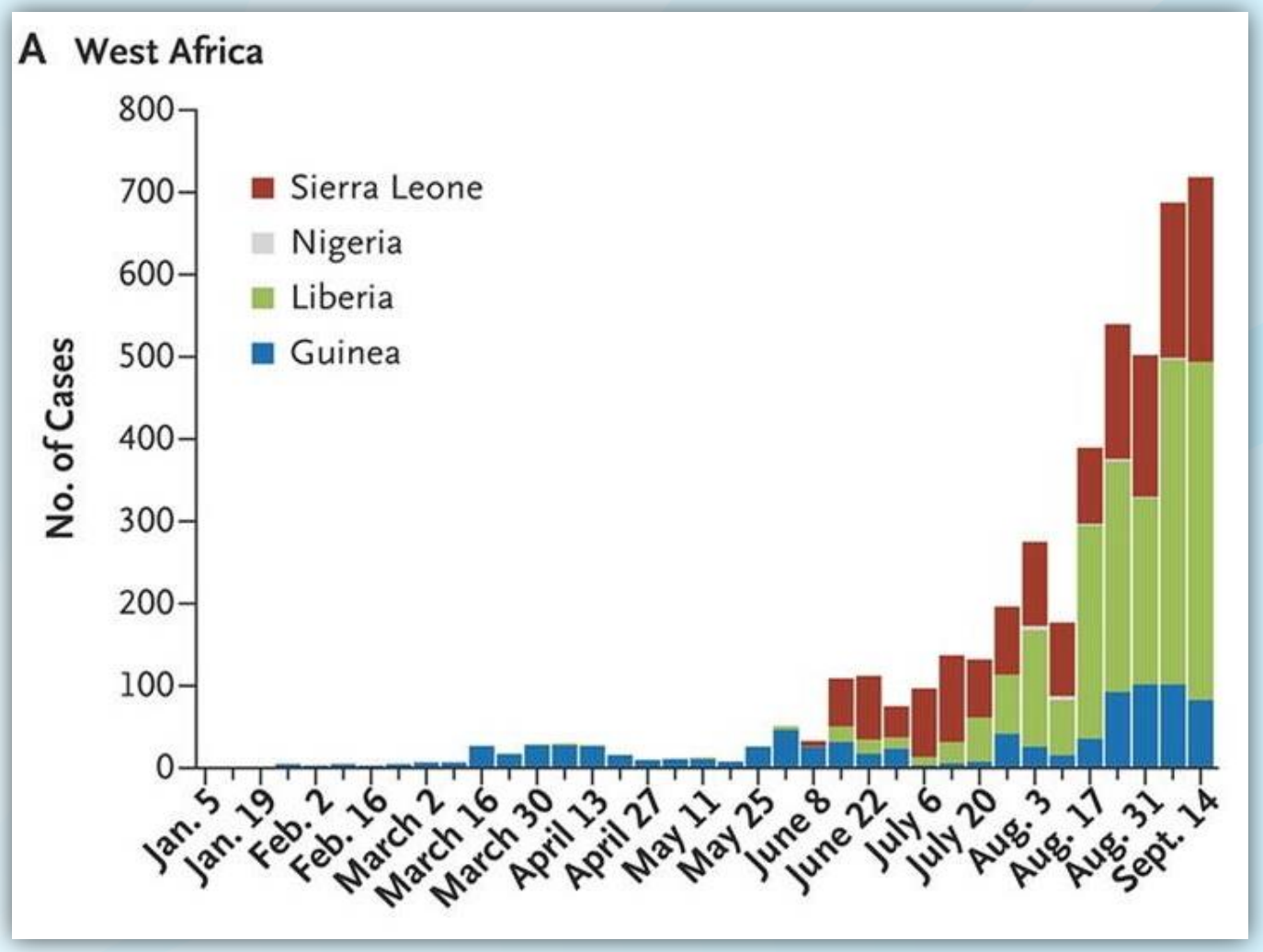


Figure. Ebola virus disease (EVD) cumulative incidence* — West Africa, October 18, 2014



* Cumulative number of reported EVD cases per 100,000 persons since December 22, 2013.
MMWR 2014;63(43):978-981

2014 Ebola Outbreak, West Africa



WHO Ebola Response Team. *N Engl J Med* 2014. DOI: 10.1056/NEJMoa1411100
http://www.nejm.org/doi/full/10.1056/NEJMoa1411100?query=featured_ebola#t=articleResults

Background: Scope of Outbreak

- Since March 2014 the virus has infected over 10,000 people in southwest Africa
  - Guinea
  - Sierra Leone
  - Liberia
- Mortality rate can exceed 50% if not contained

EVD Cases and Deaths*

	Reporting Date	Total Cases	Confirmed Cases	Total Deaths
Guinea	27 Oct 14	1,906	1,391	997
Liberia	25 Oct 14	6,535	2,515	2,413
Sierra Leone	27 Oct 14	5,235	3,700	1,500
Nigeria**	15 Oct 14	20	19	8
Spain	27 Oct 14	1	1	0
Senegal**	15 Oct 14	1	1	0
United States	24 Oct 14	4	4	1
Mali	23 Oct 14	1	1	1
TOTAL		**13,733**	**7,632**	**4,920**

Updated case counts available at http://www.cdc.gov/vhf/ebola/outbreaks/2014-west-africa/case-counts.html.

*Reported by WHO using data from Ministries of Health

**The outbreaks of EVD in Senegal and Nigeria were declared over on October 17 and 19, respectively.

EVD Cases - United States

- As of 10-24-14, EVD has been diagnosed in the U.S. in four people, one (index patient) traveled to Dallas, from Liberia, two healthcare workers (HCWs) who cared for this patient, and one medical aid who traveled to New York City from Guinea
  - **Index patient** – (Dallas) Symptoms developed on 9-24-4 approximately four days after arrival, sought medical care at Texas Health Presbyterian Hospital on 9-26-14; admitted to hospital on 9-28-14, testing confirmed EVD on 9-30-14, patient died 10-8-14.
  - **TX HCW, Case 2** – Cared for index patient, was self-monitoring and presented to hospital reporting low-grade fever, diagnosed with EVD on 10-10-14, recovered and released from NIH Clinical Center 10-24-14.
  - **TX HCW, Case 3** – Cared for index patient, was self-monitoring and reported low-grade fever, diagnosed with EVD on 10-15-14,recovered and released from Emory University Hospital in Atlanta 10-28-14.
  - **NY Medical Aid Worker, Case 4** – Worked with Ebola patients in Guinea, was self-monitoring and reported fever, diagnosed with EVD on 10-24-14, currently in isolation at Bellevue Hospital in New York City.

EVD Cases (United States)

- As of October 31, 2014, four U.S. health workers and one journalist who were infected with Ebola virus in West Africa were transported to hospitals in the United States for care
  - All the patients have recovered and have been released from the hospital after laboratory testing confirmed that they no longer have Ebola virus in their blood

Ebola Virus Transmission

- Virus present in high quantity in blood, body fluids, and excreta of *symptomatic* EVD-infected patients
- Opportunities for human-to-human transmission
  - Direct contact (through broken skin or unprotected mucous membranes) with an EVD-infected patient's blood or body fluids
  - Sharps injury (with EVD-contaminated needle or other sharp)
  - Direct contact with the corpse of a person who died of EVD
  - Indirect contact with an EVD-infected patient's blood or body fluids via a contaminated object (soiled linens or used utensils)
- Ebola can also be transmitted via contact with blood, fluids, or meat of an infected animal
  - No reports of dogs or cats becoming sick with or transmitting Ebola

Human-to-Human Transmission

- Infected persons are not contagious until onset of symptoms
- Infectiousness of body fluids (*e.g.*, viral load) increases as patient becomes more ill
  - Remains from deceased infected persons are highly infectious
- Human-to-human transmission of Ebola virus via inhalation (aerosols) has not been demonstrated

Ebola Virus Disease

- Direct infection of tissues
- Immune system affected
- Hypovolemia and vascular collapse
  - Electrolyte abnormalities
  - Multi-organ failure, septic shock

Lancet. Mar 5, 2011; 377(9768): 849–862.

EDV Clinical Presentation

- Acute onset; typically 8–10 days after exposure (range 2–21 days)
- Signs and symptoms
  - Initial: Fever, chills, myalgias, extreme fatigue, anorexia
  - After 5 days: GI symptoms (nausea, vomiting, watery diarrhea)
  - Other: Headache, conjunctivitis, hiccups, rash, chest pain, shortness of breath, confusion, seizures
  - Hemorrhagic (bleeding) symptoms in 18% of cases
- Other possible infectious causes of symptoms
  - Malaria, typhoid fever, other hemorrhagic fevers, parasitic infections fever, other bacterial infections – all very common in Africa

Clinical Features

- Nonspecific early symptoms progress to:
  - Hypovolemic (severe dehydration) shock and multi-organ failure
  - Hemorrhagic disease
  - Death
- Non-fatal cases typically improve 6–11 days after symptoms onset
- Fatal disease associated with more severe early symptoms
  - Fatality rates of 70% have been reported in rural Africa
  - Intensive care, especially early intravenous and electrolyte management, may increase the survival rate

Examples of Hemorrhagic Signs

Hematemesis

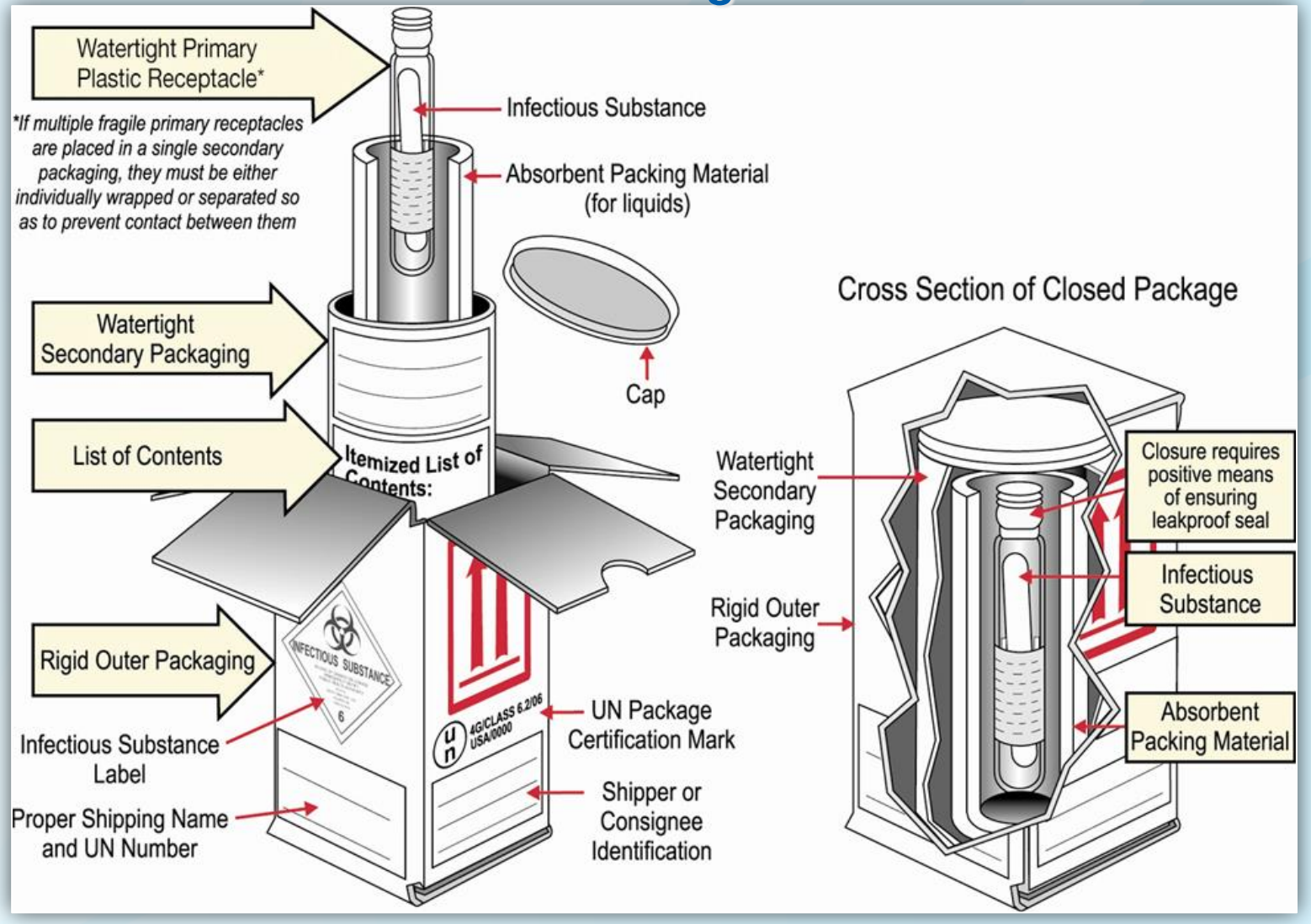
Gingival bleeding

Bleeding at IV Site

Ebola Virus Diagnosis

- Real Time PCR (RT-PCR) - blood test
  - Used to diagnose acute infection
  - Sensitive test
  - Identification of specific viral genetic RNA fragments
  - Performed in select laboratories

Packaging & Shipping Clinical Specimens to CDC for Ebola Testing



http://www.cdc.gov/vhf/ebola/hcp/packaging-diagram.html

Clinical Management of EVD: Supportive, but Aggressive

- Hypovolemia (dehydration)
  - Aggressive intravenous fluid replacement
- Electrolyte and acid-base abnormalities
  - Aggressive electrolyte monitoring and replacement
- Symptomatic management of fever and gastrointestinal symptoms
- Multisystem organ failure can develop and may require
  - Oxygenation and ventilator
  - Renal replacement therapy (dialysis)

Reference: Fowler RA et al. *Am J Respir Crit Care Med*. 2014

Investigational Therapies for EVD Patients

- No approved Ebola-specific prophylaxis or treatment
  - Ribavirin has no effect on Ebola virus
  - Therapeutics in development with limited human clinical trial data
    - Convalescent serum – from patients that recovered
    - Therapeutic medications
      - Zmapp – monoclonal antibodies
      - Tekmira – interferes with RNA
  - Vaccines – in clinical trials

References: [1]Huggins, JW et al. *Rev Infect Dis* 1989; [2]Ignatyev, G et al. *J Biotechnol* 2000; [3]Jarhling, P et al. *JID* 2007 S400; [4]Mupapa, K et al. *JID* 1999 S18; [5]Olinger, GG et al. *PNAS* 2012; [6]Dye, JM et al. *PNAS* 2012; [7]Qiu, X et al. *Sci Transl Med* 2013; [8]Qiu, X et al. *Nature* 2014; [9]Geisbert, TW et al. *JID* 2007; 10Geisbert, TW et al. *Lancet* 2010; [11]Kobinger, GP et al. *Virology* 2006; [12]Wang, D *JV* 2006; [13]Geisbert, TW et al. *JID* 2011; and [14]Gunther et al. *JID* 2011.

Patient Recovery

- Case-fatality rate 71% in the 2014 Ebola outbreak
  - Case-fatality rate is likely much lower with access to intensive care – such as patients receive in the US
- Patients who survive often have signs of clinical improvement by the second week of illness
  - Associated with the development of **virus-specific antibodies**
  - Antibody activity against Ebola persists greater than 12 years after infection
- Prolonged convalescence
  - Includes arthralgia, myalgia, abdominal pain, extreme fatigue, and anorexia; many symptoms resolve by 21 months
  - Significant arthralgia and myalgia may persist for >21 months

References: [1]WHO Ebola Response Team. *NEJM* 2014; [2]Feldman H & Geisbert TW. *Lancet* 2011; [3]Ksiazek TG et al. *JID* 1999; [4]Sanchez A et al. *J Virol* 2004; [5]Sobarzo A et al. *NEJM* 2013; and [6]Rowe AK et al. *JID* 1999.

Practical Considerations for Evaluating Patients for EVD in the United States

- CDC encourages all U.S. healthcare providers to
  - Ask patients with symptoms about a history of travel to West Africa in the 21 days before illness onset
  - Know the signs and symptoms of EVD
  - Know the initial steps to take if a diagnosis of EVD is suspected
- CDC has developed documents to facilitate these evaluations
  - The EVD algorithm for the evaluation of a returned traveler
    - Available at http://www.cdc.gov/vhf/ebola/pdf/ebola-algorithm.pdf
  - The checklist for evaluation of a patient being evaluated for EVD
    - Available at http://www.cdc.gov/vhf/ebola/pdf/checklist-patients-evaluated-us-evd.pdf

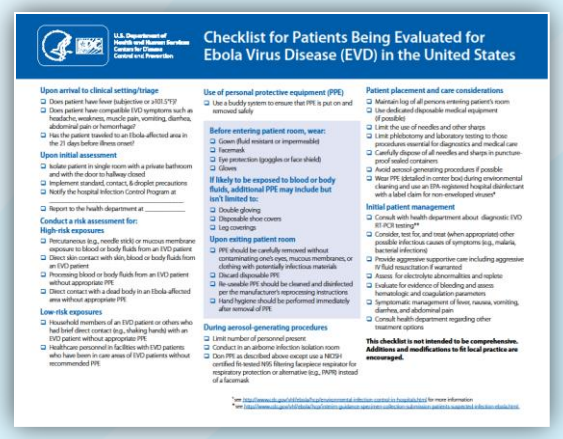
What is being done to prevent transmission in the US?

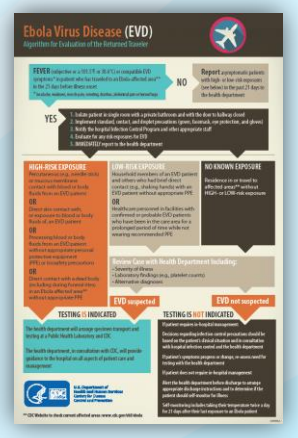
- **Early recognition is critical to controlling the spread of EVD**
- If a diagnosis of EVD is being considered, the patient should be isolated immediately, public health should be contacted and the patient should receive a medical evaluation by a medical professional
- Infection control should be contacted immediately.

What is being done in WI to prevent transmission in the US / WI?

- Persons accessing healthcare who have a travel history in the last 21 days and signs or symptoms of EVD will be isolated at the healthcare facility and further screened by a health professional
- In WI, the Local Health Department (LHD) and Division of Public Health (DPH) will also be contacted immediately regarding a person under investigation

EVD Algorithm for Evaluation of the Returned Traveler


Checklist for Patients Being Evaluated for Ebola Virus Disease (EVD) in the United States


Ebola Virus Disease (EVD)

FEVER (subjective or ≥100.4°F or 38.0°C) or compatible Ebola symptoms* in a patient who has resided in or traveled to a country with wide-spread Ebola transmission** in the 21 days before illness onset

* headache, weakness, muscle pain, vomiting, diarrhea, abdominal pain, or hemorrhage

NO

Report asymptomatic patients with high- or low-risk exposures (see below) in the past 21 days to the health department

YES

1. Isolate patient in single room with a private bathroom and with the door to hallway closed
2. Implement standard, contact, and droplet precautions (gown, facemask, eye protection, and gloves)
3. Notify the hospital Infection Control Program and other appropriate staff
4. Evaluate for any risk exposures for Ebola
5. IMMEDIATELY report to the health department

**CDC Website to check current affected areas: www.cdc.gov/vhf/ebola
Algorithm available at http://www.cdc.gov/vhf/ebola/pdf/ebola-algorithm.pdf
Checklist available at http://www.cdc.gov/vhf/ebola/pdf/checklist-patients-evaluated-us-evd.pdf

Case Definition

- Travel in the past 21 days to a country where Ebola transmission is active **OR** contact with a person with known Ebola infection

AND

- Fever of 100.4 F or greater **OR** headache, weakness, vomiting, diarrhea, abdominal pain or hemorrhage (symptoms)

Other measures to prevent transmission in the US

- Travel restrictions to / from some countries
- Airport screening and notification of the state health department at the traveler's destination state
- Healthcare facility screening

Information Packet Given to Travelers

EBOLA CARE KIT — INTRODUCTION

Welcome to the United States

Whether you are returning home or just visiting, we hope you enjoy your time in the United States. We know that you just came from a country with an Ebola outbreak and that this can cause worry and fear. We want to make sure that you know what to do now. We also want to make sure you know what to do to protect your health and the health of those who are close to you.

This is the **Check and Report Ebola** (or, CARE) Kit. The kit has information about Ebola. It also contains tools to help you do daily health checks for the next 21 days. Your daily health check will include a temperature check and a symptom check.

You will find these 6 items in your CARE Kit:

1	**Digital thermometer** *A thermometer is in your kit so that you can take your temperature every morning and every night for 21 days.*
2	**Directions for your digital thermometer** (Title: Take your Temperature Two Times a day, Morning and Night) *Explains how to:* • *take your temperature using the thermometer in your kit, and* • *record your thermometer reading*
3	**Ebola CARE Kit Health Advisory** *The health advisory is a quick tool to remind you to check your temperature and do health checks 2 times each day for 21 days. This tool also reminds you who to call if you have symptoms.*
4	**Symptom Card and Symptom Log** *The Symptom Card shows the signs and symptoms of Ebola.* *The Symptom Log asks you to do a health check each day. Then, write down the date, your temperature, and any symptoms you may have. You should do this health check 2 times a day, for 21 days after your arrival into the United States.*
5	**A Check and Report Ebola (CARE) Card** *The CARE Card is a simple reminder to do a health check each day and who to call if you have symptoms.* **If you call the state health department or a doctor, tell them you have a CARE card.** *Keep this card with you for 21 days after your arrival in the United States*
6	**List of State Health Department Telephone Numbers** This is a list of telephone numbers for state health departments across the United States. The list is given so you may contact the state health department in the state you are in to report any symptoms.

Once 21 days have passed, if you have no symptoms or fever, you are no longer at risk of Ebola.

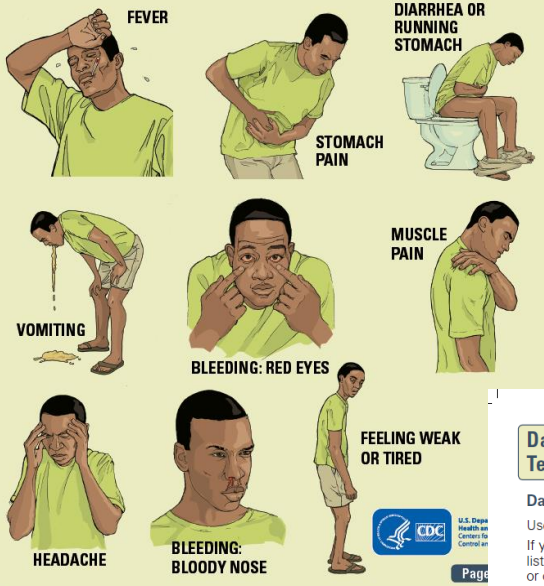
We hope you find this kit useful. Please use it to keep yours[elf] [and] too. Together, we can protect everyone from Ebola.

EBOLA CARE Kit Symptom Card and Log

Track Your Symptoms on the following pages for 21 days.

If you have any of these symptoms during the next 21 days, call the State Health Department or call CDC: 1-800-232-4636. If you have a medical emergency, call 911.

Remember:
Check symptoms and report early! Getting care early is your best chance to get better.



HEALTH ADVISORY: EBOLA

Ebola spreads through direct contact with the blood of body fluids (such as spit or pee) of a person who is sick with Ebola symptoms.

Watch for fever, headaches, and body aches for the next 3 weeks.

If you get sick, stay at home, then call the **State Health Department** or call **CDC: 1-800-232-4636.**

If you have a medical emergency, call 911.

Daily Body Symptoms and Temperature Check — Week #1

Date you arrived in United States: / /

Use this form to record your temperature and symptoms every morning and every night.

If your temperature is **100.4°F** or **38°C** or above OR if you have any of the symptoms listed on the symptom card, please call the **State Health Department** where you are or call **CDC INFO: 1-800-232 4636**

If you have a medical emergency, call 9-1-1.

DAY	SYMPTOMS	TEMP°
1	MORNING / EVENING	MORNING / EVENING
2	MORNING / EVENING	MORNING / EVENING
3	MORNING / EVENING	MORNING / EVENING
4	MORNING / EVENING	MORNING / EVENING
5	MORNING / EVENING	MORNING / EVENING
6	MORNING / EVENING	MORNING / EVENING
7	MORNING / EVENING	MORNING / EVENING

What is being done to prevent transmission in the US / WI?

- Persons accessing healthcare who have a travel history in the last 21 days and signs or symptoms of EVD will be isolated at the healthcare facility and further screened by a health professional
- In WI, the Local Health Department (LHD) and Division of Public Health (DPH) will also be contacted regarding a person under investigation

EVD Risk Assessment

HIGH-RISK EXPOSURE

Percutaneous (e.g., needle stick) or mucous membrane contact with blood or body fluids from an Ebola patient

OR

Direct skin contact with, or exposure to blood or body fluids of, an Ebola patient

OR

Processing blood or body fluids from an Ebola patient without appropriate personal protective equipment (PPE) or biosafety precautions

OR

Direct contact with a dead body (including during funeral rites) in a country with wide-spread Ebola transmission** without appropriate PPE

LOW-RISK EXPOSURE

Household members of an Ebola patient and others who had brief direct contact (e.g., shaking hands) with an Ebola patient without appropriate PPE

OR

Healthcare personnel in facilities with confirmed or probable Ebola patients who have been in the care area for a prolonged period of time while not wearing recommended PPE

NO KNOWN EXPOSURE

Residence in or travel to a country with wide-spread Ebola transmission** without HIGH- or LOW-risk exposure

**CDC Website to check current affected areas: www.cdc.gov/vhf/ebola

Interim Guidance for Monitoring and Movement of Persons with EVD Exposure

- CDC has created guidance for monitoring people exposed to Ebola virus but without symptoms

RISK LEVEL	PUBLIC HEALTH ACTION		
	Monitoring	**Restricted Public Activities**	**Restricted Travel**
HIGH risk	Direct Active Monitoring	Yes	Yes
SOME risk	Direct Active Monitoring	Case-by-case assessment	Case-by-case assessment
LOW risk	Active Monitoring for some; Direct Active Monitoring for others	No	No
NO risk	No	No	No

www.cdc.gov/vhf/ebola/hcp/monitoring-and-movement-of-persons-with-exposure.html

What is being done to prevent transmission in the US / WI?

- Contact tracing (by local and state health departments) to identify all persons who had contact with an infected individual.
- Contacts are monitored for 21 days following the last contact with the infected individual

EVD Risk Assessment

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NO KNOWN EXPOSURE

Residence in or travel to a country with wide-spread Ebola transmission** without HIGH- or LOW-risk exposure

**CDC Website to check current affected areas: www.cdc.gov/vhf/ebola

Monitoring and Movement Restrictions

- Potentially exposed persons may have had:
  - high risk exposure
  - Some risk
  - Low (but not zero)
  - No identifiable risk

Monitoring and Movement Restrictions – **Asymptomatic persons** - depends on level of risk

- Such persons will undergo ACTIVE monitoring

OR

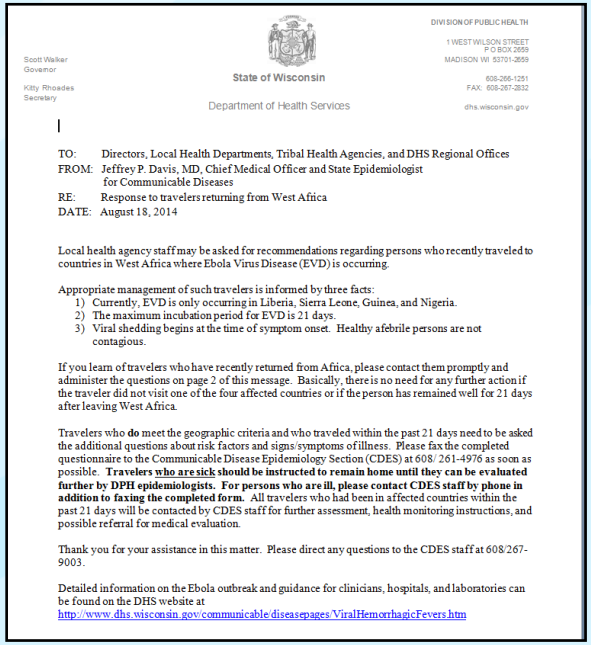
- DIRECT ACTIVE monitoring, in person daily contact – movement restrictions will apply

Direct Active Monitoring

- Direct active monitoring: A public health official directly observes the individual at least once a day to review symptoms and check temperature
- Recommended for persons with:
  - Contact with infectious fluids via needle stick, mucosal exposure, or skin exposure
  - Handling infectious body fluids as in a lab without PPE
  - Touching a corpse in an endemic country without PPE
  - Living with and caring for an Ebola patient
  - In endemic countries, direct contact with a person showing symptoms of Ebola while wearing PPE (e.g., an MSF volunteer)
- Consult with DPH regarding details of direct active monitoring. Movement restrictions for the above groups may be required.

Recent Wisconsin Update

- Guidance on traveler monitoring sent from DPH to LHDs twice before on 8/19/14 and 9/4/14
- Since then, all travelers from Guinea, Liberia, and Sierra Leone must enter USA via one of 5 airports
- Since then, CDC has instituted enhanced arrival screening at these airports for such travelers



Scott Walker
Governor

Kitty Rhoades
Secretary

State of Wisconsin

Department of Health Services

DIVISION OF PUBLIC HEALTH

1 WEST WILSON STREET
P O BOX 2659
MADISON WI 53701-2659

608-266-1251
FAX: 608-267-2832

dhs.wisconsin.gov

TO: Directors, Local Health Departments, Tribal Health Agencies, and DHS Regional Offices
FROM: Jeffrey P. Davis, MD, Chief Medical Officer and State Epidemiologist for Communicable Diseases
RE: Response to travelers returning from West Africa
DATE: August 18, 2014

Local health agency staff may be asked for recommendations regarding persons who recently traveled to countries in West Africa where Ebola Virus Disease (EVD) is occurring.

Appropriate management of such travelers is informed by three facts:

1) Currently, EVD is only occurring in Liberia, Sierra Leone, Guinea, and Nigeria.
2) The maximum incubation period for EVD is 21 days.
3) Viral shedding begins at the time of symptom onset. Healthy afebrile persons are not contagious.

If you learn of travelers who have recently returned from Africa, please contact them promptly and administer the questions on page 2 of this message. Basically, there is no need for any further action if the traveler did not visit one of the four affected countries or if the person has remained well for 21 days after leaving West Africa.

Travelers who **do** meet the geographic criteria and who traveled within the past 21 days need to be asked the additional questions about risk factors and signs/symptoms of illness. Please fax the completed questionnaire to the Communicable Disease Epidemiology Section (CDES) at 608/ 261-4976 as soon as possible. **Travelers who are sick should be instructed to remain home until they can be evaluated further by DPH epidemiologists. For persons who are ill, please contact CDES staff by phone in addition to faxing the completed form.** All travelers who had been in affected countries within the past 21 days will be contacted by CDES staff for further assessment, health monitoring instructions, and possible referral for medical evaluation.

Thank you for your assistance in this matter. Please direct any questions to the CDES staff at 608/267-9003.

Detailed information on the Ebola outbreak and guidance for clinicians, hospitals, and laboratories can be found on the DHS website at
http://www.dhs.wisconsin.gov/communicable/diseasepages/ViralHemorrhagicFevers.htm

- CDC has issued updated guidance for state and local health departments regarding post-arrival monitoring
  www.cdc.gov/media/releases/2014/p1022-post-arrival-monitoring.html

What has recently changed in WI?

- Since August, 42 travelers from W. Africa have been monitored in WI
- The **new changes** in guidance from DPH:
  - DPH is now immediately notified by CDC of new arrivals and the results of their airport screening (as before, DPH contacts LHD)
  - Nigeria is no longer considered an Ebola-endemic country
  - CDC is requiring DAILY monitoring of travelers and recommends that LHDs attempt to locate travelers who do not check-in daily This is called active monitoring
  - DPH has created electronic forms that can be used with the DPH electronic investigation and reporting function of WEDSS
  - This new guidance is detailed in an email sent 10/27/14 to all local health officers
  - Upon screening, arrivals are provided with a thermometer and an informational packet

What hasn’t changed?

- DPH will continue to notify the LHD in the jurisdiction where the traveler resides or will be staying
- LHDs will continue to report the results of the monitoring to DPH at the end of 21 days - or sooner if any issues arise
- For travelers who report potential exposures to Ebola virus, DPH staff in consultation with LHD staff will decide if restrictions on movement need to be imposed and whether direct active monitoring is required
- To date, no such restrictions have been necessary

EVD Summary

- The 2014 Ebola outbreak in West Africa is the largest in history and has affected multiple countries
- Think Ebola: U.S. healthcare providers should be aware of clinical presentation and risk factors for EVD
- Human-to-human transmission by direct contact
  - No human-to-human transmission via inhalation (aerosols)
  - No transmission before symptom onset
- Early case identification, isolation, treatment and effective infection control are essential to prevent Ebola transmission

Websites

- www.cdc.gov/vhf/ebola/
- https://share.health.wisconsin.gov/ph/pca/EbolaResponse/SitePages/Home.aspx

- Jeannie Druckenmiller

  608-267-0401

  jean.druckenmiller@wi.gov